

REMARKS

Claims 1, 3, 5, 6, 17, 19 and 21 stand rejected under 35 U.S.C. 103(a) as being anticipated by United States Patent No. 6,049,302 to Hinckley, Jr. ("the Hinckley reference") in view of United States Patent No. 6,148,020 to Emi ("the Emi reference").

Claim 1 recites:

A method of suppressing interference in a radar device, comprising the steps of:

- transmitting signals with a carrier frequency;
- transmitting the signals as pulsed signals with a pulse repetition frequency;
- varying the pulse repetition frequency during operation of the radar device; and
- varying the carrier frequency during operation of the radar device.

The Hinckley reference describes a **pulse Doppler radar** that "uses a coherent pulse train, i.e., a train of pulses that are samples of a **single unmodulated sine wave, which is a carrier.**" (Hinckley, col. 1 ll. 14-16; *emphasis added*). The Emi reference describes radio communication system in which a transmitter is synchronized with a receiver and the transmitted carrier wave adjusted according to a frequency hopping spread code list. (Emi, col. 1, ll. 8-13). Applicants respectfully note that the two applied references are not only non-analogous art, but the asserted combination would render the prior art invention being modified unsatisfactory for its intended purpose.

In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned. *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992); see also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992). MPEP 2141.01(a).

For example, in *Wang Laboratories, Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993), patent claims were directed to single in-line memory modules (SIMMs) for installation on a printed circuit motherboard for use in personal computers. Reference to a SIMM for an industrial controller was not necessarily in the same field of endeavor as the claimed subject matter merely because it related to memories. Reference was found to be in a different field of

endeavor because it involved memory circuits in which modules of varying sizes may be added or replaced, whereas the claimed invention involved compact modular memories. Furthermore, **since memory modules of the claims at issue were intended for personal computers and used dynamic random-access-memories, whereas reference SIMM was developed for use in large industrial machine controllers and only taught the use of static random-access-memories or read-only-memories, the finding that the reference was nonanalogous was supported by substantial evidence.** (See MPEP 2141.01(a); *emphasis added*).

The Hinckley reference is related to pulse Doppler radar for tracking missiles and airplanes. In contrast, the Emi reference is related to a radio communication system for transmitting data. Additionally, the Hinckley reference specifically describes using a single unmodulated sine wave as the carrier wave. The Hinckley reference further discloses carefully selecting the pulse repetition frequencies so that clutter PRF lines do not fall inside the target band. (Hinckley, col. 1, ll. 42-43). According to the Doppler principle, the target band is a function of the target velocity and the frequency of the carrier wave. A change in either the target velocity or the carrier wave will alter the frequency of the target band. A primary objective of the Hinckley reference is to prevent clutter PRFs from falling into this target band. The Hinckley reference describes that the ability to remove the clutter PRFs is possible, in part, because the Doppler shift from the target is greater than the Doppler shift of the clutter. Specifically, the Hinckley reference discloses the following:

By using the invention, a radar engineer chooses an IF frequency plan for a radar receiver related to the PRF (pulse repetition frequency) space in such a way that clutter PRF lines from the negative carrier frequency lay on top of the clutter PRF lines from the positive carrier frequency. This is to keep the clutter PRF lines outside the target band which prevents clutter from being detected as a false target. This is possible because the Doppler frequency shift of clutter is less than that of a moving target, such as an airplane or missile.

The PRF space consists of the pulse repetition frequencies from which the software waveform control algorithm may choose one PRF at a time. The criteria for selecting a PRF depends on the application. For a radar seeker on a guided missile, the essential criteria is to choose a waveform that places the target return clear of the transmit pulse and clear of the clutter return in Doppler frequency. (Hinckley, col. 3, ll. 47-63).

The target band is defined as $2(V_m + V_t)/\lambda$ where V_m is the missile velocity, V_t is the target velocity, and λ is the carrier wavelength. (Hinckley, Fig. 3). To avoid interference from the clutter PRFs, the PRF “lines” must be forced outside of the target band. (Hinckley, Fig. 3). **Employing a frequency hopping carrier wave to the Hinckley system would cause the target frequency band to move.** Such shifting could result in the clutter PRFs falling within the shifted target band. Since this result is counter to the objective of the Hinckley reference, the Hinckley reference would lead one of ordinary skill away from such a modification asserted by the Examiner. Furthermore, the Hinckley reference specifically states that the carrier wave is an **unmodulated sine wave**. Therefore, the Hinckley teaches to use a steady carrier wave and to not vary the carrier wave during operation of the radar, in contrast to the Examiner’s assertion. Furthermore, there is no indication, in contrast to the Examiner’s assertion, that the Hinckley system experiences interference from other devices, or that varying the carrier wave would suppress any such interference to reduce “false alarms.”

The Emi reference, on the other hand, describes a communication method in which different frequencies are assigned to different codes for transmitting data. (Emi, col. 1, ll. 26-65). The Emi reference does not relate to using Doppler frequency shift to detect a fast moving target, nor does the Emi reference relate to a system using a pulse repetition frequency. Furthermore, there is no indication in the Emi reference that frequency hopping, i.e., changing frequencies, would suppress interference from other devices when employed in a pulse Doppler radar system. In addition, the Emi reference simply does not teach or suggest how to modify such a radar to account for a shifting target band due to the varying carrier frequency, or how to prevent clutter PRFs from falling in the target band when the carrier is varied.

As can be seen from above, the Hinckley and Emi references relate to different art, and there is no indication, suggestion, or motivation how one would employ the teaching of the Emi reference to modify the system disclosed in the Hinckley reference to achieve each and every feature recited in Claim 1 or its device claim counterpart, Claim 17. In fact, attempting to apply the teaching of the Emi reference to the Hinckley reference would cause additional interference in the disclosed radar system, thus rendering the radar system useless for its intended purpose, and thereby defeat the obviousness conclusion as a matter of law. MPEP § 2143.01.

Since the Hinckley and Emi references are non-analogous art, and since the Hinckley and Emi references, as a whole, not only teach away from the features recited in

Claims 1 and 17 but also render the Hinckley reference unsatisfactory for its original intended purpose, the Hinckley and Emi references do not render obvious independent Claims 1 and 17, as well as their dependent Claims 3, 5-6, 19 and 21, under 35 U.S.C. §103(a). It is therefore respectfully requested that this rejection be withdrawn.

Claims 4 and 20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Hinckley reference in view of the Emi reference and in view of United States Patent No. 4,717,917 to Alitz (“the Alitz reference”). Claim 4 depends from Claim 1, and Claim 20 depends from Claim 17.

As described above, the Hinckley reference and the Emi reference are non-analogous art. Furthermore, applying the Emi reference to the Hinckley reference would render the radar system disclosed in the Hinckley reference useless for its intended purpose. Addition of the Alitz reference not only fails to overcome these deficiencies, but actually renders the Hinckley reference unsatisfactory for its intended purpose

The Alitz reference describes “an alien radar suppression circuit having the capability of eliminating alien radar indications on a receiver display when such alien **radar is transmitting on essentially the same frequency.**” (Alitz, col. 2, ll. 5-9; *emphasis added*). This suppression is achieved using a transmitter that varies the PRF in a random manner on a pulse-to-pulse basis. (Alitz, col. 3, ll. 9-11). Varying the PRF in a random manner is **contrary to the teaching of the Hinckley reference.** According to the Hinckley reference, the PRFs are selected specifically as integer multiples of the intermediate such that clutter PRFs do not appear in the target band. (Hinckley, Abstract). Varying the PRFs in a random manner would cause clutter PRFs to fall within the target band, thereby creating interference and rendering useless the principle objective disclosed in the Hinckley reference.

Furthermore, the Alitz reference describes a method to avoid alien interference caused by another transmitter using the same carrier frequency. There is no teaching, suggestion, or motivation to use such a method **while varying the carrier frequency.** Indeed, by varying the carrier frequency, the motivation to use the method disclosed by the Alitz reference is no longer present.

Moreover, as described above, the Emi reference is non-analogous art. Furthermore, the Emi reference does not employ PRF, and applying a random PRF to the Emi reference would interfere with the data communication described in the Emi reference.

Since the Emi reference is non-analogous art to the Hinckley and Alitz references, there is no motivation to combine the Hinckley and Alitz references. Furthermore, applying the teaching of the Alitz reference to the Hinckley reference would

render the radar system disclosed in the Hinckley reference useless for its intended purpose. Accordingly, the combination of the Hinckley, Alitz and Emi references does not render Claims 4 and 20 obvious under 35 U.S.C. §103(a). It is therefore respectfully requested that this rejection be withdrawn.

Claims 7-8 and 22-23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Hinckley reference in view of the Emi reference and in view of United States Patent No. 3,979,752 to Charlot ("the Charlot reference"). Claims 7 and 8 depend from Claim1, and Claims 22 and 23 depend from Claim17.

As described above, the Hinckley and Emi references are non-analogous art. Furthermore, applying the teachings of the Emi reference to the Hinckley reference would render the radar system disclosed in the Hinckley reference unsatisfactory for its intended purpose. The Charlot reference does not overcome this deficiency. For at least these reasons, the combination of Hinckley, Emi and Charlot references does not render Claims 7-8 and 22-23 obvious under 35 U.S.C. §103(a). It is therefore respectfully requested that this rejection be withdrawn.

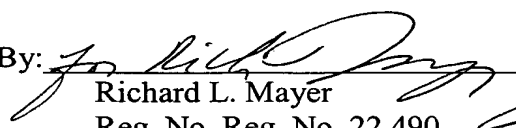
CONCLUSION

In light of the foregoing, Applicants respectfully submit that all of the pending claims are in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully Submitted,

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